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S/205/62/002/002/002/015
1020/1220

AUTHOR: Koznova, L. B.

TITLE: Dependence of death rate in mice on radiation dose

PERIODICAL: Radiobiologiya, v.2, no. 2, 1962, 216-221

TEXT: The authors examined the influence of various massive doses of constant irradiation on the life span of mice and on their physiological systems. Irradiation rates of 147, 110, 36, 14.4, 7.2, 3.6, 3.01, 0.78-0.72, 0.506-0.475, 0.128 and 0.019 r/sec were used. 110 white mice, weighing 22-26 g, were examined. When rates of 147-3.6 r/sec were used, the behaviour of the mice could be subdivided into 5 periods: 1) motor activity; 2) rest; 3) second period of motor activity; 4) motor discoordination and 5) spasms. The anatomic-pathological examination performed immediately after death showed an enormous hyperemia of parenchymatous organs, especially the liver. When rates of 1.128-0.019 r/sec were used, hyperemia of internal organs, atrophy of spleen and a paretic state of the digestive tract were observed. There is 1 figure and 2 tables.

SUBMITTED: July 12, 1961

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S/241/62/007/001/001/006

1015/1215

AUTHOR: Domshlak, M. P., Grigor'yev, Yu. G., Darenskaya, N. G., Koznova, L. B., Nevskaya, G.F.
Nesterova, V. I. and Tereshchenko, N. Ya.

TITLE: Remote observations on persons subjected to radiotherapy

PERIODICAL: Meditsinskaya radiologiya, v. 7, no. 1, 1962, 10-16

TEXT: A previous report (Domshlak et. al., 1957) dealt with observations on 160 persons who had been subjected to X-ray and gamma-ray therapy 2 to 7 years prior to the study period. The present article is based on observations on 218 persons, aged thirty to sixty, at various intervals (up to 10 years) after having been subjected to radiation. In 41.9% of the cases, the general condition of persons irradiated in the past became worse. On the other hand, no abnormal pressure was noticed, despite the fact that hypertension was a common finding during the irradiation period. Ophthalmological examination did not reveal any changes except those due to aging. Various functional disorders were noticed in the nervous system, including both cortical and sub-cortical disturbances. In some cases, microsymptoms of organic damage of the CNS were present. There is 1 table.

X

SUBMITTED: July 3, 1961

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KOZNOVA, L.B.

Dosage characteristics and γ -ray injury in mice using a 48 kr/min dose.
Med. rad. 9 no.3:56-61 Mr '64. (MIRA 17:12)

L 144160-66 EWT(m) GD

ACC NR: AT6029634

SOURCE CODE: UR/0000/66/000/000/0255/0265

AUTHOR: Koznova, L. B.; Grinev, V. S.

44

B+1

ORG: none

TITLE: Dependence of time-to-death of mice on dose rate under conditions of continuous irradiation

SOURCE: Voprosy obshchey radiobiologii (Problems of general radiobiology). Moscow, Atomizdat, 1966, 255-265

TOPIC TAGS: ionizing radiation biologic effect, radiation biologic effect, relative biologic efficiency, induced radiation effect, radiation dose rate, mouse, gamma radiation, mathematic model, biologic model, biologic process model

ABSTRACT: Dependence of time-to-death on dose rate was studied for mice continuously exposed to gamma rays until dead for a wide range of dose rates (from 1.6×10^{-2} to 8.6×10^2 r/sec) by computer (Ural-2) analysis of data in the literature. Using G. A. Sacher's concept of unit radiation injury $\Phi(\tau)$ at a dose power of unity over the time interval τ to $\tau + \Delta\tau$, and regarding the aging process as a linear function of time, the authors derive his "cumulative lethality" C_L for the lifespan t^* of an animal following commencement of irradiation as

$$C_L(t^*) = \frac{1}{P} \left(1 - \frac{t^*}{t_0} \right),$$

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ACC NR: AT6029634

where P is constant dose power and t_0 is the average life of a nonirradiated animal. Construction of a detailed mathematical model of the processes operating during continuous irradiation was attempted. Death occurs when the viability index C of the organism falls below some critical value. An equation was derived to describe changes in C during continuous irradiation at dose rate P:

$$\frac{dC}{dt} = -APC + B(1-C) - NPt,$$

where $C(0)$, the viability of a nonirradiated organism, is taken as 1, and t is lifetime under conditions of continuous irradiation, A is the rate of decline of viability, B the rate of compensatory and reparative processes, and N the rate of development of irreversible changes, proportional to the cumulative dose (pt). Solved for C(t), this yields:

$$C(t) = \left(1 - \frac{B}{AP+B} - \frac{NP}{A^2(AP+B)^2}\right) (-1 + e^{-(AP+B)t}) - \frac{NPt}{AP+B} + 1.$$

Substitution of t^* gives an equation relating P and t^* if A, B, N, and $C(t^*)$ are treated as parameters. A universal model of the dependence of lifespan during continuous irradiation on dose power for a wide range of dose rates cannot be devised, since it is not true (as Sacher assumed) that the three parts of his curve differ only because of variations in the rates of injurious and regenerative

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ACC NR: AT6029634

processes (A, B, and N) at different dose rates. The authors regard regeneration during continuous irradiation as negligible (any normalization of indices being compensatory and temporary), and attribute the differences in the three parts of the curve to the predominance of different mechanisms of injury at different dose rates. When death is rapid, the CNS suffers heaviest damage ("brain death"); when death is slower, the stress of CNS compensation leads to severe damage to internal organs ("somatic death"). Prolonged demands on compensatory and protective mechanisms due to continuous exposure to an adverse factor may disrupt these mechanisms. It was therefore necessary to obtain the parameters A, B, and N independently for the three parts of the curve. Analysis of the data showed that: 1) The lowest values of $C(t^*) = 0.05$ (viability at time of death) occurred at dose rates from 0.53 to 860 r/sec; the greatest value of $C(t^*) = 0.3$ occurred at dose rates of 0.01 to 0.14 r/sec. 2) The slowest rate of injury (i.e., least value of A) occurred at dose rates of 0.01 to 0.14 r/sec. 3) The rate of compensatory-reparative processes (parameter B) is constant at dose rates from 0.01 to 860 r/sec and increases at lower dose rates (0.01×10^{-2} to 0.05×10^{-2} r/sec). 4) Irreversible changes (parameter N) develop at approximately the same rate for all dose rates studied. To summarize, computer analysis of literature data on the survival time of mice continuously irradiated with dose rates from 1.16×10^{-4} to 8.6×10^2 r/sec was used to establish the dependence of mean life expectancy on dose power and as a basis for a modified mathematical model of death due to continuous irradiation at a constant dose. Orig. art. has: 3 figures, 6 formulas, and 2 tables. [DP]

LS SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 030/ OTH REF: 022/ ATD PRESS: 5073
Card 3/3

L 03781-67 EWT(m) GD

ACC NR: AT6029629

SOURCE CODE: UR/0000/66/000/000/0150/0157

AUTHOR: Volokhova, N. A.; Gubin, V. A.; Darenskaya, N. G.; Koznova,
L. B.; Korchenkin, V. I.; Nevskaya, G. F.; Sedov, V. V.

ORG: none

TITLE: Peculiarities of clinical manifestations of radiation sickness
in rhesus monkeys during gamma-ray irradiation.

SOURCE: Voprosy obshchey radiobiologii (Problems of general radio-
biology). Moscow, Atomizdat, 1966, 150-157

TOPIC TAGS: ~~radiation~~ radiation biologic effect, monkey, dog, ^{ionizing} radiation,
~~hematologic effect~~ *hematology*

ABSTRACT: A comprehensive clinical examination of gamma-irradiated
monkeys was conducted, and the data were compared with results of similar
examinations of dogs. Seventeen monkeys (Macaca rhesus) of both sexes,
weighing 2.0 to 4.0 kg, were subjected to gamma irradiation from an
EGO-2 apparatus with a dose rate of 357-313 r/min. Prior to irradi-
tion, all monkeys had been under clinical observation for 2-3 weeks.
Eleven of the 14 monkeys irradiated with 300 r died (average duration
of life 16.5 days), while two of the 3 monkeys irradiated with 350 r
died (29.5 and 36.2 days after irradiation). Both groups of gamma-

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ACC NR: AT6029629

irradiated monkeys were considered together, since the clinical manifestations of radiation sickness were similar in both groups. Experimental data were compared with data from analogous dog experiments, using a 300-r dose of gamma rays, and no essential differences in the radiation effect were noted between the two species. However, the spread of life durations in monkeys (6.5—36.2 days) was wider than for dogs (11.5—18.5 days). The primary reaction to radiation was more pronounced and developed more rapidly in monkeys than in dogs. The primary radiation reaction was absent in 2 out of 17 monkeys, as compared with 18 out of 28 dogs. Furthermore, seven monkeys experienced severe primary radiation reactions, while none of the dogs did. In the first 10—11 days after irradiation, no essential differences were noted between the temperature reactions of monkeys and dogs. However, by the time of death dogs had elevated body temperatures (average 1.5°C above normal), whereas monkeys' temperatures had fallen considerably below normal. Symptoms of radiation sickness appeared later (15—18 days after irradiation) and developed more gradually in monkeys than in dogs (7—12 days). Autonomic dysfunction is considered responsible for the lability of symptoms in monkeys in the early postradiation period. This hypothesis is substantiated by the considerable variations in blood pressure, the unstable heart rhythm, etc. Hematopoietic changes in monkeys in response to radiation had a phase character, demonstrating the different course of the radiation reaction in different

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ACC NR: AT6029629

types of cells. Since blood regeneration occurred even in monkeys dying after 30—36 days, it was concluded that blood changes were not the primary factor in animal deaths. The lower lethal dose values encountered in these experiments are partially explained by differing experimental conditions, but require further study. Orig. art. has: 2 figures and 1 table. [JS]

SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 008/ OTH REF: 006
ATD PRESS: 3064

Card 3/3

I. 03774-67 EWT(m) CD
ACC NR: AT6029637

SOURCE CODE: UR/0000/66/000/000/0281/0294

AUTHOR: Skuratovich, A. A.; Koznova, L. B.

ORG: none

TITLE: The biological effect of ultrafractionated irradiation

SOURCE: Voprosy obshchey radiobiologii (Problems of general radiobiology). Moscow, Atomizdat, 1966, 281-294

TOPIC TAGS: ~~x-ray radiation biologic effect, particular radiation biologic effect, corpuscular radiation, pulsed radiation~~ *irradiation*

ABSTRACT: Literature studies of the biological effect of ultrafractionated irradiation on lower animals are reviewed and results are compared. Ultrafractionated radiation is defined as a series of radiation pulses (several microseconds or milliseconds in length) separated by intervals of up to a few seconds' duration. With this type of radiation, the dose rate can be affected by the pulse frequency, length of the pulse, and the relationship between pulse length and interval length. Investigations conducted in the last decade have mostly shown that the biological effect of pulsed radiation is less than the effect of uninterrupted radiation. Shekhtman irradiated wheat sprouts with pulsed x-rays and uninterrupted x-rays in doses of 500 and 1000 r. It was observed that 1000 r of pulsed x-rays had a lesser biological effect than the same dose of uninterrupted x-rays (10% judged by the length of roots 120 hr after

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ACC NR: AT6029637

moistening). Hofmann and Mueller irradiated fruit-fly eggs 4.5 hr old with β -rays from a radium source in doses of 400—800 r. Experiments showed that increasing the pulse frequency increased the damaging effect of the radiation. However, above a certain limit the biological effect decreased even though the pulse frequency increased further. Increasing the ratio of pulse to pause (for example from 1:4.7 to 1:2.25) shifted the maximum effect in the direction of higher frequencies. Increasing the dose (while retaining the same pulse-to-pause ratio) also shifted the maximum effect to higher frequencies. It was observed that the damaging effect of uninterrupted irradiation was greater than the biological effect of pulsed radiation. The variety of results obtained by different researchers is explained by the different biological objects used (rabbit skin, human skin, tumor tissue, *Ascaris* eggs, fruit-fly eggs, wheat seeds, etc.), by the different irradiation parameters, and the different types of radiation (x-rays and Ra-rays). The following general conclusions were drawn after comparing results of all the experiments reviewed. 1) The effect of pulse frequency on biological effect depends on the object. 2) Pulse frequency does not influence the final biological effect with x-ray irradiation; however, for certain biological objects the greatest damaging effect of β -radiation appears at a definite pulse frequency. 3) In most cases, increasing the ratio of pulse to pause increases the biological effect. There is no generally accepted explanation for the observed difference between the biological effects of ultrafractionated and uninterrupted irradiation. Orig. art. has: 5 figures. [JS]

SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 001/ OTH REF: 021/ ATD PRESS:

Cord 2/2 *tdh* 5064

L 10279-67

ACC NR: AT6029623

rate of irradiated animals, the selected $LD_{100/30}$ should be 5% higher than the standard dose value to avoid significant fluctuations ($\pm 5\%$). In evaluating investigation results, it should be noted that change of gamma or x-ray irradiation dose rates within the 15 to 150 r/min range does not seriously affect irradiation action; also, decrease of gamma or X-ray irradiation dose rates below 15 r/min or increase exceeding 2000 r/min weakens the biological radiation effect. For more effective comparison of radiosensitivity, experimental animals should be of the same sex, same weight category and age. In evaluating experimental data the following factors should be taken into consideration: time of year animals were irradiated, radiosensitivity differences of the given animal strain or line, and indices showing the statistical reliability of experimental results. Orig. art. has: 10 tables and 12 figures.

SUB CODE: 06/ SUEH DATE: 23 Apr66/ ORIG REF: 019/ OTH REF: 005

L 11276-67 EWT(m) GD

ACC NR: AT6029635

SOURCE CODE: UR/0000/66/000/000/0265/0273

AUTHOR: Koznova, L. B.; Bobrovnikov, I. D.

ORG: none

TITLE: Radiobiological significance of the time factor in a dose curve plateau

SOURCE: Voprosy obshchey radiobiologii (Problems of general radiobiology). Moscow, Atomizdat, 1966, 265-273

TOPIC TAGS: mouse, ionizing radiation biologic effect, irradiation intensity, radiation tolerance, radiation sickness

ABSTRACT: Differences in length of survival of animals irradiated with the same dose but at different dose rates prompted the present study. The effect of a dose rate on length of survival and the effect of a dose rate on the plateau of a dose-effect curve were investigated in a series of experiments. White male mice weighing 18 to 24 g were gamma irradiated in a dose range of 1500 to 72,000 r at dose rates of 1,014, 3.0, 8.7, 252, 1158 and 48,000 r/min. Indices included clinical symptoms of disease, mean survival periods, and post mortem findings. (See Fig. 1). The figure shows that a dose-effect plateau takes place with dose rates of 252, 1158 and 48,000 r/min. Increase of dose rate from 252 to 48,000 r/min contributes to growth of survival periods. A comparison of clinical disease symptoms for dose rates of 252, 1158 and

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ACC NR: AT6029635

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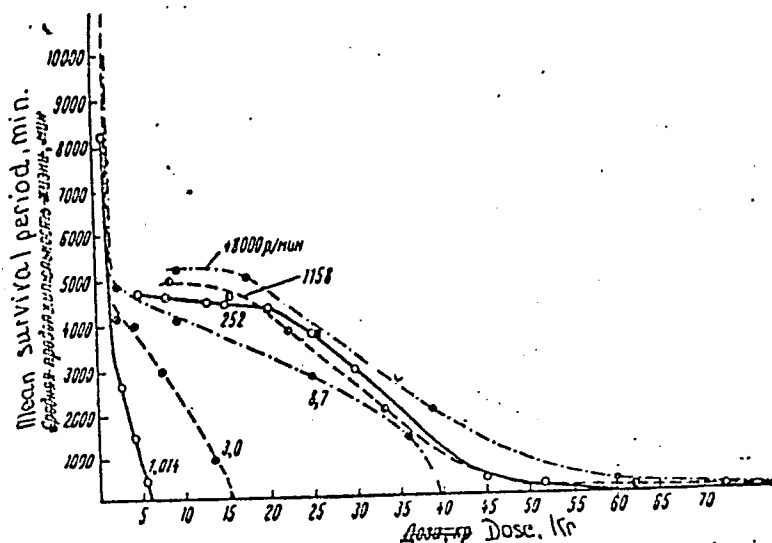


Fig. 1. Mean survival periods of mice irradiated with dose rates of 3.0 to 48,000 r/min.

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11278-87

ACC NR: AT6029635

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48,000 r/min did not disclose any significant differences. Marked symptoms of intestinal death were found with doses up to 19,000 r, and deaths due to central nervous system damage were found with higher doses. Duration of irradiation, the time factor, rather than the dose rate basically determines radiation damage within a dose rate range of 1.014 to 8.7 r/min. A mathematical analysis of the experimental data is given. Orig. art. has: 4 figures, 2 tables and 5 formulas.

SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 004/ OTH REF: 008

Card 3/3 jb

L:11277-67 ENT(1)/ENT(m) JK/GD SOURCE CODE: UR/0000/65/000/000/0273/0277
 AT6029636

AUTHOR: Pershina, Z. G.; Koznova, L. B.; Sobolev, S. M.; Khrushchev, V. G.

ORG: none

TITLE: Influence of dose rate and time factor on the bactericidal effect of irradiation

SOURCE: Voprosy obshchey radiobiologii (Problems of general radiobiology). Moscow, Atomizdat, 1966, 273-277

TOPIC TAGS: microorganism contamination, gamma irradiation, particular radiation biologic effect, irradiation intensity

ABSTRACT: Experiments were conducted on vegetative microorganisms, *B. coli* 613, and on spore form microorganisms, *B. anthracoides*, to determine the influence of dose rate and time on the bactericidal effect of irradiation. *B. coli* 613 were gamma irradiated with single 50 hr doses at dose rates of 111.5 r/min (7 hr 29 min), 334.5 r/min (2 hrs 29 min), 600 r/min (83 min 20 sec) and 14,760 r/min (3 min 23 sec). The highest bactericidal effects were found with dose rates of 111.5 and 334.5 r/min. Similar results were found with irradiation of *B. coli* 613 with a 100,000 r dose at dose rates of 107 r/min (15 hrs 35 min) and 320 r/min (5 hrs 12 min 30 sec). A complete bactericidal effect was achieved with the 107 r/min dose rate, while with the 320 r/min

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AT6029636

"APPROVED FOR RELEASE: Monday, July 31, 2000

200

dose rate. Bacterial colonies increased by $2.3 \times 10^{-5}\%$. In experiments on *B. anthracoides*, irradiation with a 800,000 r dose at a dose rate of 174 r/min produces a complete bactericidal effect, whereas a dose rate of 48,000 r/min increases the number of bacteria by $9 \times 10^{-2}\%$. With irradiation of bacteria in higher concentrations using the same dose, a comparable dependence of bactericidal effect on dose rate is found, but is less markedly expressed. Experimental data show that increase of irradiation time in the dose rate range of 111.5 to 48,000 r/min increases the bactericidal effect. Future studies should be directed toward finding optimal irradiation conditions for complete bactericidal effects. Orig. art. has: 2 tables.

SUB CODE: 06/ SUBM DATE: 23Apr66/ ORIG REF: 005/ OTH REF: 005

KOZNOY, A. M.

PA 18T23

USSR/Fertilizers
Agriculture

Aug 1947

"Solikamsk: A Potash Fertilizer Center," A. M.
Koznoy, 3 pp

"Nauka i Zhizn'" No 8

Brief historical account and general description of
the potash combine at Solikamsk.

18T23

KOZOBKOV, A.A.; MESSERMAN, A.S.

Automatic instrument for recording the characteristics of centrifugal pumps. Prom.energ. 16 no.6:11-16 Je '61. (MIRA 15:1)
(Centrifugal pumps--Testing)

KOZOBKOV, A.A.; KHACHATURYAN, S.A.

Extinguishing pressure surges in the pipelines of compressor machinery. Izv. vys. ucheb. zav.; neft' i gaz 5 no.10:83-88 '62. (MIR' 17:8)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina i Vsesoyuznyy zaochnyy politekhnicheskoy institut.

KOZOBKOV, A.A.; MESSERMAN, A.S.

Using the ESU-1 apparatus for the automation of processes in
petroleum refineries and chemical industries. Prom. eng. g.
17 no.1:43-47 Ja '62. (MIRA 14:12)
(Liquid level indicators)
(Automatic control)

BOBROVSKIY, S.A.; KOZOBKOV, A.A.; MESSERMAN, A.S.

Tensiometer for measuring pressure pulsations in pipelines. Transp.
i khran.nefti no.6:6-9 '63. (MIRA 17:3)

1, Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti
im. I.M.Gubkina.

KOZOBKOV, A.A.; KHACHATURIAN, S.A.

Spectrum of natural frequencies of gas oscillations in the
communication systems of compressor machines. Trudy MINKHIGP
no.45:69-73 '63. (MIRA 16:7)

(Gas pipes) (Compressors) (Gas dynamics)

KOZOBKOV, A.A.; MESSERMAN, A.S.

Measurement of pressure pulsations for the selection of dampers in
compressor stations. Gaz. delo no.8:22-28 '63. (MIRA 17:3)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti
im. akademika Gubkina.

KOZOBKOV, A.A.; MESSERMAN, A.S.; KHACHATURYAN, S.A.

Simulating gas-flow motion in a gas pipeline. Izv. vys. ucheb.
zav.; nef't' i gaz 6 no.10:83-85 '63. (MIRA 17:3)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti
im. akademika I.M.Gubkina i Vsesoyuznyy zaochnyy politekhnicheskoy
institut.

KOZOBKOV, A.A.; MESSERMAN, A.S.; PISAREVSKIY, V.M.

Mobil laboratory for the combined investigation of piston
compressor machinery. Gaz. delo no.2:16-18 '64.

(MIRA 17:6)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut
meftekhimicheskoy i gazovoy promyshlennosti im. akad. Gubkina.

BOBROVSKIY, S.A.; KOZOLKOV, A.A.; MESSERMAN, A.S.

Tensomanometer for measuring pressure pulsations in pipelines.
Transp. i khran. nefti i nefteprod. no.4:10-14*64

(MIRA 17:7)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut nefte-
khimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina.

ACCESSION NR: AP4042323

S/0094/64/000/007/0024/0027

AUTHOR: Kozobkov, A. A. (Engineer); Messerman, A. S. (Engineer)

TITLE: Device for simultaneous measurement of pressure pulsation in two points of a gas line

SOURCE: Promyshlennaya energetika, no. 7, 1964, 24-27

TOPIC TAGS: pressure pulsation, pressure pulsation gauge, pulsation quencher, pulsation annihilator

ABSTRACT: The development of a new instrument for measuring pressure pulsations in compressor gas lines is reported. The instrument, intended to aid in evaluating pulsation-annihilating characteristics of buffer capacities, etc., meets these specifications: pulsation-frequency range, 2-200 cps; sensor line length, 50 m; weight, 3 kg; 127-220 v a-c supply. Signals from sensors 1 and 2 (Fig. 1, Enclosure 1) are fed to 7-kc electron switch 3 which alternatively applies

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ACCESSION NR: AP4042323

the signals to electron oscillograph 4. Carrier-frequency oscillator 5 feeds the sensors and depends, for its operation, on a-c power-supply unit 6. Induction-type 0-200-ata pressure sensors (Fig 2, Enclosure 1), described by D. I. Ageykin, et al., in the book, "Automatic-control-system sensors," Mashgiz, 1959, are used. Diaphragm 1 follows the pulsations (0-1,200 cps) and varies the reluctance of the magnetic circuit of coil 2. Coil 2 and compensating coil 3 are connected to two adjacent arms of a bridge which eliminates ambient-temperature errors. The electronic circuit for two sensors, shown in Fig 3, Enclosure 2, includes two measuring bridges Br_1 and Br_2 whose balance is indicated by T_6 and T_7 indicator tubes, a 6-kc carrier oscillator (T_3 , T_4 , T_5), and an electronic switch (T_1 and T_2). Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 00

ENCL: 02

SUB CODE: FR

NO REF SOV: 005

OTHER: 000

Card 2/4

BOBROVSKIY, S.A.; KOZOBKOV, A.A.; MESSERMAN, A.S.

Inductive gauge for measuring pressure surges in pipelines. Transp. i
khran. nefti i nefteprod. no.9:3-5 '64. (MIRA 17:10)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut neftekhimi-
cheskoy i gazovoy promyshlennosti im. akad. Gubkina.

KOZOBKOV, A.A.; MESSERMAN, A.S.

Dynamic calibration of pressure-pulsation gauges. Mash. i nef. obor.
no. 8:28-30 '64. (MIRA 17:11)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut neftekhimi-
cheskoy i gazovoy promyshlennosti im. akademika Gubkina.

KOZOBKOV, A.A.; MESSERMAN, A.S.; KHACHATURYAN, S.A.

Estimating the error in the electric modeling of a pulsating
gas flow. Gaz. prom. 9 no.11:42-46 '64. (MIRA 17:12)

KOZOBKOV, A.A.; MESSERMAN, A.S.; KHACHATURYAN, S.A.

Modeling pipelines composed of pipes of various diameters. Izv.
vys. ucheb. zav.; neft' i gaz 8 no.1.91-93 '65. (MIRA 18:2)

1. Moskovskiy institut neft'ekhimicheskoy i gazovoy promyshlennosti
imeni akademika I.M. Gubkina.

KOZOBKOV, A.A., inzh.; MESSERMAN, A.S., inzh.

Device for the simultaneous measurement of pressure fluctuations at
two points in a gas main. Prom.energ. 19 no.7:24-27 J1 '64.
(MIRA 18:1)

VLADISLAVLEV, A.S.; KOZOBKOV, A.A.; MESSERMAN, A.S.; PISAREVSKIY, V.M.;
KHACHATURYAN, S.A.

Physical modeling of the pressure vibrations in pipeline
systems. Gaz. delo no.1:14-17 '65.

(MIRA 18:6)

1. Moskovskiy ordena Trudovogo Krasnogo Znameni institut
neftekhimicheskoy i gazovoy promyshlennosti im. akad. Gukina
i Vsesoyuznyy zaochnyy politekhnicheskoy institut.

ARONZON, N.Z., kand.tekhn.nauk; KOZOBKOV, A.A., kand. tekhn.nauk; KHACHATURYAN,
S.A., kand.tekhn.nauk; KOZLOV, V.A., inzh.

Electrical model of a piston-type compressor station. Prom. energ.
20 no.10:43-45 0 '65. (MIRA 18:10)

KOZOBROD, A. B., inzhener.

The DSVD boring machine designed for the underground boring of
deep holes. Gor.shur. no.5:55-57 My '56. (MLRA 9:8)
(Boring machinery)

KOZOBROD, V.P.; ZUBKO, V.O.

International connections of institutions of the Ukrainian Academy
of Sciences. Dop.AN URSS no.11:1568-1571 '60. (MIRA 13:11)
(Academy of Sciences of the Ukrainian S.S.R.)

Kozobrodov, A.S.

USSR / Forestry. Forest Economy.

K-4

Abs Jour: Ref Zhur - Biologiya, No. 1, 1958, 1352

Author : Kozobrodov, A.S.

Inst : Archangel Forest Engineering Institute

Title : Special Aspects of Replacement of Aspen on
Heavily Cut-Over Areas Where Tractors and Winch
Drag Lines Were Used for Trailing

Orig Pub: Sb. stud. nauchno-issled. rabot. Arkhangelsk.
lesotekhn. in-t, 1957, No. 1, 18-25

Abstract: No abstract.

Card 1/1

KOZOCHKINA, Yelena Dmitriyevna; SHEVTSOV, N.S., prof., red.;
KORNILENKO, V.S., red.; GEORGIYEVA, G.I., tekhn.red.

[Struggle of the Communist Party to build a second coal
reserve in the Soviet Union] Bor'ba Kommunisticheskoi
partii za sozdanie vtoroi ugol'noi bazy Sovetskogo Soюза.
Izd-vo Mosk.univ., 1959. 36 p. (MIRA 12:6)
(Kuznetsk Basin--Coal mines and mining)

69330

S/129/60/000/05/003/023
E193/E283

18.7100

AUTHORS: Bessonov, V. D., Kozochkina, Ye. S., and
Soboleva, K. G.

TITLE: Reducing the Distortion of Semi-Fabricated Sections
and Components of Alloy V95 During Quenching

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
1960, Nr 5, pp 11-15 (USSR)

ABSTRACT: Components, made of the high-strength aluminium alloy V95,
tend to distort during quenching, the degree of the
distortion depending on the quenching conditions and
the shape and size of the component. The object of the
present investigation was to establish conditions under
which the distortion would be reduced to minimum, either
by changing the rate of quenching (by varying the
temperature of the quenching medium), or by the appli-
cation of anodizing process. The experiments were carried
out on ring specimens of the shape, shown in Fig 1a,
and on lengths of extruded T-section, illustrated in
Fig 1b; both specimens were made of the alloy V95M;
the variation of the dimension A (slot width) was taken
as the measure of distortion of the ring specimen and
the depth of the curvature in the case of T-shaped

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E193/E283

Reducing the Distortion of Semi-Fabricated Sections and Components of Alloy V95 During Quenching

specimens. A nitrate bath was used for heating the specimens, which were quenched from 465 to 480°C in water whose temperature varied between 20 and 90°C. The results are reproduced in Fig 2, where the distortion (mm) is plotted against the temperature of the quenching medium (°C), graphs a and b relating to the ring and T-shaped specimens, respectively. It will be seen that significant reduction in the degree of distortion was attained only when the temperature of the quenching medium was raised to 80°C, and the object of the next series of experiments was to check to what extent the mechanical properties of the alloy would be affected by the variation of the temperature of the quenching medium. The alloy (V95), used in these experiments, contained 5.7% Zn, 0.41% Mn, 2.75% Mg, 2% Cu, 0.55% Si, 0.17% Cr, 0.23% Fe, the remainder Al. The specimens, measuring 135 x 80 x 60 mm, and prepared from extruded material, were quenched from 465 to 480°C and then aged at 135 to 145°C for 16 h, after which mechanical tests

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Reducing the Distortion of Semi-Fabricated Sections and Components of Alloy V95 During Quenching

were carried out on test pieces, cut out from the central portion of the heat-treated specimens. The results are reproduced in Fig 3, where UTS (kg/mm^2 , left-hand scale, continuous curve) and elongation (% , right-hand scale, broken curve) are plotted against the temperature ($^{\circ}\text{C}$) of the quenching water; the upper and lower horizontal lines on these graphs show the T-Ch specification limits for UTS and elongation, respectively. It will be seen that the mechanical properties of the alloy were unaffected by raising the temperature of the quenching water up to 70°C ; further increase in the temperature of the quenching medium resulted in a rapid decrease of UTS, attributed to partial decomposition of the solid solution during quenching. This was confirmed by metallographic examination, the results of which are reproduced in Fig 4, showing the micro-structure of alloy V95 quenched in water at (a) 70 and (b) 95°C . The rapid decrease of UTS of the alloy, brought about by raising the temperature of the quenching water to 80°C , rendered this method of reducing distortion impracticable; however, it is known

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Reducing the Distortion of Semi-Fabricated Sections and Components of Alloy V95 During Quenching

that hardenability and age-hardening characteristics of aluminium alloys can be improved by anodizing treatment and it was just possible that by using this expedient, the alloy could be quenched in water at 80°C without losing its strength. This problem was studied in the next series of experiments, in which specimens (40 x 90 x 180 mm) of alloy V95 were used. After quenching and ageing for 16 h at 135 to 140°C, hardness measurements were taken on the cross-sections of the specimens at points situated (1.5 mm apart) on the line joining the surface and the centre of the specimens. The results are reproduced in Fig 5, where hardness (Rockwell B) of the heat-treated specimens is plotted against the temperature (°C) of the quenching water, curves 1, 2, 3 and 4 relating to specimens with the thickness of the anodized film equal 50, 10, 5, and 0 microns, respectively; the horizontal line on this graph indicates the T-Ch specification limit for hardness of the investigated alloy. It will be seen that hardness of both anodized

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Reducing the Distortion of Semi-Fabricated Sections and Components
of Alloy V95 During Quenching

and untreated specimens was hardly affected by the variation of the temperature of the quenching water up to 80°C. However, above that temperature the hardness of untreated specimens fell sharply, whereas that of the anodized material decreased only by a negligible amount. The effect of anodizing on the distortion of T-shaped specimens was studied next. The results are reproduced in Fig 6, where the degree of distortion (mm) due to quenching is plotted against the temperature (°C) of the quenching water, graphs a and b relating to untreated and anodized specimens respectively. It was found that the anodizing treatment had practically no effect on the degree of distortion during quenching; the degree of distortion of both anodized and untreated material decreased by a factor of 4 after raising the temperature of the quenching water from 20 to 80°C. To check the results obtained on small specimens, the experiments were repeated on large panels (both anodized and untreated) of the same alloy, measuring

Card 5/7 1700 x 662 x 8 mm. The results are reproduced in Fig 7, 1X

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showing the degree of warping (mm, + or -) of anodized (a) and untreated (b) panels, heated and quenched under various conditions. Reading from left to right, the results relate to panels quenched in water at 20°C (first three graphs), 70°C (the next three graphs) and 75°C (the last graph); Nos 1, 2 and 3 relate to panels: 1 - heated in the horizontal position and dropped into the quenching tank from a height of 1.5 to 2 m; 2 - heated in the vertical position and dropped into the quenching tank; 3 - heated in the horizontal position and immersed in the quenching tank with the aid of a hoist. On the basis of the results obtained, the following procedure was recommended for heat-treating components made of alloy V95: (a) preliminary anodizing of the components to produce a surface oxide layer 5 to 50 microns thick; (b) heating the components to 465 to 480°C; (c) quenching in water at 80 to 85°C; Card 6/7 (d) ageing at 135 to 145°C for 16 h; (e) removing

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the anodized coating. It was also concluded that,
irrespective of the temperature of the quenching medium,
the degree of distortion of this alloy during quenching
can be reduced by increasing the speed of immersion of
the components in the quenching medium. There are
7 figures. ✓

Card 7/7

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GORETSKIY, L.I.; MIKHAYLOV, N.V.; UR'YEV, N.B.; GORSHKOV, D.I.; KOZODAYEV, G.A.;
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Machines using colloidal cement glue for repairing airfield and road
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Membrane temperature regulator of a simplified design. Khim.
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" π - π Intergation at Low Energies"

Institute of Theoretical and Experimental Physics, Moscow, USSR

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4-11 July 1962

KOZODON, M.S., inzh.

Transformer substations for street-lighting systems. Gor.
khov.Mosk. 33 no.10:30-32 0 '59. (MIRA 13:2)

1. Rukovoditel' gruppy Instituta general'nogo plana g.Moskvy.
(Street lighting) (Electric substations)

KOZODOYEV, Ivan Iosifovich for Doc Econ Sci on the basis of dissertation defended
29 May 59 in Council of Mos Order of Lenin and Order of Labor Red Banner State
Univ in Lomonosov, entitled "Problems of land relations in socialist countries."
(BMEVSSO USSR, 1-61, 29)

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KOZODOYEV, Ivan Iosifovich; ASTAKHOV, V., red.; KOROLEVA, A., mladshiy
red.; CHEPELEVA, O., tekhn.red.

[Theoretical study of land relations in socialist countries]
Zemel'nye otnosheniia v sotsialisticheskikh stranakh; ocherk
teorii. Moskva, Izd-vo sotsial'no-ekon.lit-ry, 1960. 351 p.
(MIRA 13:7)

(Land tenure)

(Rent (Economic theory))

BOZHDEDOMOV, Aleksandr Ivanovich; KOZODOYEV, I.I., prof., red.;
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[Petroleum leases in capitalist countries] Neftianaya renta v
stranakh kapitalizma. Pod obshchei red. I.I.Kozodoeva. Moskva,
Sotsekgiz, 1962. 337 p. (MIRA 15:7)
(Oil and gas leases)

KOZODAYEV, M. S.

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Emission of positrons from a thorium-active deposit. A. I. Alikhanov, A. I. Alikhan'yan and M. S. Kozodaev. Nature 136, 475-6 (1935); cf. C. A. 28, 7141⁶ : The energy distribution of positrons emitted by Al, activated by Th B C, is shown graphically. A distribution curve for positrons from Pb, activated by Th C -rays, is given for comparison. The Al positron curve is analyzed into a curve which agrees with the asym. theoretical curve of Jaeger and Hulme (C.A. 29, 3229⁴) for the conversion of the -line (by ≈ 2620 e. kv.), and an almost sym. curve, probably due to the effect of -radiation. The probability of internal conversion of Th C -rays is $4.5-5.5 \times 10^{-4}$, close to the theoretical value of Hulme and Jaeger. The yield of positrons from Th C C and Ra C particles is 0.02-0.03%.

G. M. Petty

KOZODAYEV, M. S.

Emission of positrons from radioactive sources. A. I. Alikhanov, A. I. Alikhan'yan and M. S. Kozodaev. Nature 136, 719-20 (1935); cf. C. A. 29, 7789³- A spectrum of positrons from Ru is given, and is compared with one from a Th active deposit. The spectrum is continuous up to about 1700 e. kv., plus discontinuities at 760 and 1100 e. kv. due to the internal conversion of 2 strong Ra γ -rays with energies of 1760 and 2200 e. kv. The ratio of positrons to Ra C γ -particles is $2-3 \times 10^{-4}$. An approx. equal no. of positrons was produced in Pb by Ra C γ -rays from the source. When Pb and Al were irradiated by both α - and γ -rays, most of the pair production was due to Ra C γ -rays. G. M. P.

KOZODAEV, M.S., ALIKHANOV, A.I., and ALICHANIAN, A.I.
KOZODAYEV

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et le Radium, Serie 7, Vol. 7, pp. 163-172, 1936.

Institut Physico Technique de Leningrad

Kozodayev, M. [S.]
 Pulse chopper of the Geiger-Müller counter. M. Kozodayev and G. Latshev. *Comp. rend. acad. sci. R. S. S. 20, 21-3 (1938) (in English)*. An improved circ. circuit, enabling higher counts to be made, is given. Tube circuit for the Geiger-Müller counter. M. Kozodayev. *Ibid.* 23 6 (in English).—It is shown that a radio tube circuit cannot reduce the duration of the pulse, i. e., increase the count of the counter.

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KOZODAYEV, M. (S)

with A.I. Alikhanov, A.I. Alikhan'yan, "Measurement of e/m_0 for β -particles of Radium C" Compt Rend. Acad. Sci. USSR, 20, pp 427-8, 1938. Analysis of the β -particles from Ra C with a mass spectrograph shows that if n heavy electrons, with masses 2,3,4, or 5 m_0 , are emitted in addition to ordinary electrons, the ratio of heavy to ordinary electrons is less than 1:200. Since this ratio is much smaller than that calculated for the emission of heavy electrons, apparently electrons with masses from 2-5 m_0 do not exist in nature. Analogous results are obtained with β -particles from Ra.

KOZODAYEV, M. S.

Scattering of fast electrons through large angles. A. I. Alikhanov, A. I. Alikhan'yan and M. S. Kozodaev. Compt. rend. acad. sci. U. R. S. S. 24, 525-7 (1939) (in English).- The single scattering of electrons, through an angle of 90° , with energies from 600 to 2000 c. kv. was investigated with an aim of verifying Mott's formula. A homogeneous beam of electrons from a magnetic spectrograph was caused to impinge on a thin foil of various thicknesses of celluloid. Al, Cu and Au placed at an angle of 45° to the beam, and the scattered electrons were registered by the coincidence of simultaneous discharge in 2 Geiger-Muller counters placed at an angle of 90° with respect to the beam. The authors found to be equal to 0.31, 0.0, 5.6 and 78 (= 0.29, 1, 6, 178) for celluloid, Al, Cu and Au, resp., and they conclude that with the exception of Au the large-angle scattering of electrons with energies of the order of 1000c. kv. is in good agreement with quantum-mech. considerations.

F. G.

SANIN, A.A. Primala uchastiye TITOVA, T.A., aspirantka; KOZODAYEV, M.S., red.; SERDYUKOV, A.R., red.; SHCHUKIN, Ye.D., red.; FURASHOVA, N.Ya., tekhn. red.

[Radio engineering methods for studying radiation] Radiotekhnicheskie metody issledovaniia izlucheni. Pod red. M.S.Kozodaeva. Moskva, Gos.izd-vo tekhniko-teoret.lit-ry, 1951. 388 p. (MIRA 15:1)

1. Moskovskiy Gosudarstvennyy universitet (for Titova). (Amplifiers (Electronics)) (Pulse techniques (Electronics))

KOZODAYEV, M.S.; FILIPPOV, A.I.

Measuring the masses of cosmic-ray particles by means of the
cloud chamber. Izv.AN SSSR.Ser.fiz.19 no.6:711-714 N-D '55.
(MLBA 9:4)

1.Institut yadernykh problem Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

KOZODAYEV, M.S.; MARKOV, A.A.; TYAPKIN, A.A.

~~Measuring π^+ -meson lifetime. Izv.AN SSSR.Ser.fiz.19 no.6:~~
Measuring π^+ -meson lifetime. Izv.AN SSSR.Ser.fiz.19 no.6:
715-719 N-D '55. (MLRA 9:4)

1.Institut yadernykh problem Akademii nauk SSSR.
(Cosmic rays) (Nuclear physics)

KOZODAYEV, M. S.

USSR/ Physics - Pie-mesons

Card 1/1 Pub. 22 - 21, 60

Authors : Tyapkin, A. A.; Kozodaev, M. S.; and Prokoshkin, Yu. D.

Title : Formation of π^0 -mesons with protons of 670 Mev of energy at the nuclei of various elements

Periodical : Dok. AN SSSR 100/4, 689-692, Feb 1, 1955

Abstract : Experiments with the formation of π^0 -mesons through a proton collision with another proton are described. The protons in the experiments had an energy of 670 Mev. Formations of π^0 -mesons were observed on nuclei of various elements, namely: D, Li, Be, B, C, Al, C, Cd, Sn and Pb. The experiments were conducted with the acceleration of the Institute of Nuclear Problems of the Acad. of Scs., USSR. Five references: 3 USA and 2 USSR (1952-1954). Graphs.

Institution : Acad. of Scs., USSR, Institute of Nuclear Problems

Presented by: Academician L. A. Artsimovich, December 22, 1954

KOLEBAYEV, M.S., BAKUROV, Y.D., TYATKIN, A.A.

Investigation of energy and angular distributions of
 π^0 -mesons produced by protons with energies of 470
and 600 MeV (II/50)

CERN-Symposium on High Energy Accelerators and Pion
Physics.

Geneva 11-23 June 56
in Branch #5

KOZODAYEV, M.S.; TYAPKIN, A.A.

Tight elastic current-conductor for determining charged
particle trajectories in magnetic fields. Prib. i tekhn.
eksp. no.1:21-24 J1-Ag '56. (MLRA 10:2)

1. Institut yadernykh problem Akademii nauk SSSR.
(Particles, Elementary) (Nuclear physics)



Kozodayev, M.S.

INSTRUMENTATION: CLOUD CHAMBERS

"Measurement of Masses of Particles With the Aid of Two Cloud Chambers"
by M.S. Kozodayev, A.I. Filippov, and V.T. Osipenkov, Institute of Nuclear Problems, Academy of Sciences USSR, Pribory i Tekhnika Eksperimenta, No 2, September-October 1956, pp 18-25.

Description of a setup with two cloud chambers for the measurement of masses of cosmic-ray particles. The mass is determined from the momentum and from the ionization range. The aperture ratio of the setup is calculated and the errors in the measurement of the mass of the particle is analyzed. Reference is made to work by Bloembergen and van Heerden (Physical Review, 1951, 83, 561) and Mather and Segre (Physical Review, 1951, 84, 191).

Card 1/1

KOZODAYEV M.S.

DZHELEPOV, V.P.; KOZODAYEV, M.S.; OSIPENKOV, V.T.; PETROV, N.I.; RUSAKOV,
V.A.

Wilson chamber in a pulse magnetic field used in synchrocyclotron
nuclear investigations. Frib.1 tekhn. eksp. no.3:3-9 N-D '56.

(MLRA 10:2)

1. Ob"edinennyy institut yadernykh issledovaniy.
(Cloud chamber) (Cyclotron)

KOZODAYEV, M.S.

USSR/Nuclear Physics - Installations and Instruments.
Methods of Measurement and Research.

C-2

Abs Jour : Ref Zhur - Fizika, No 4, 1957, 8513

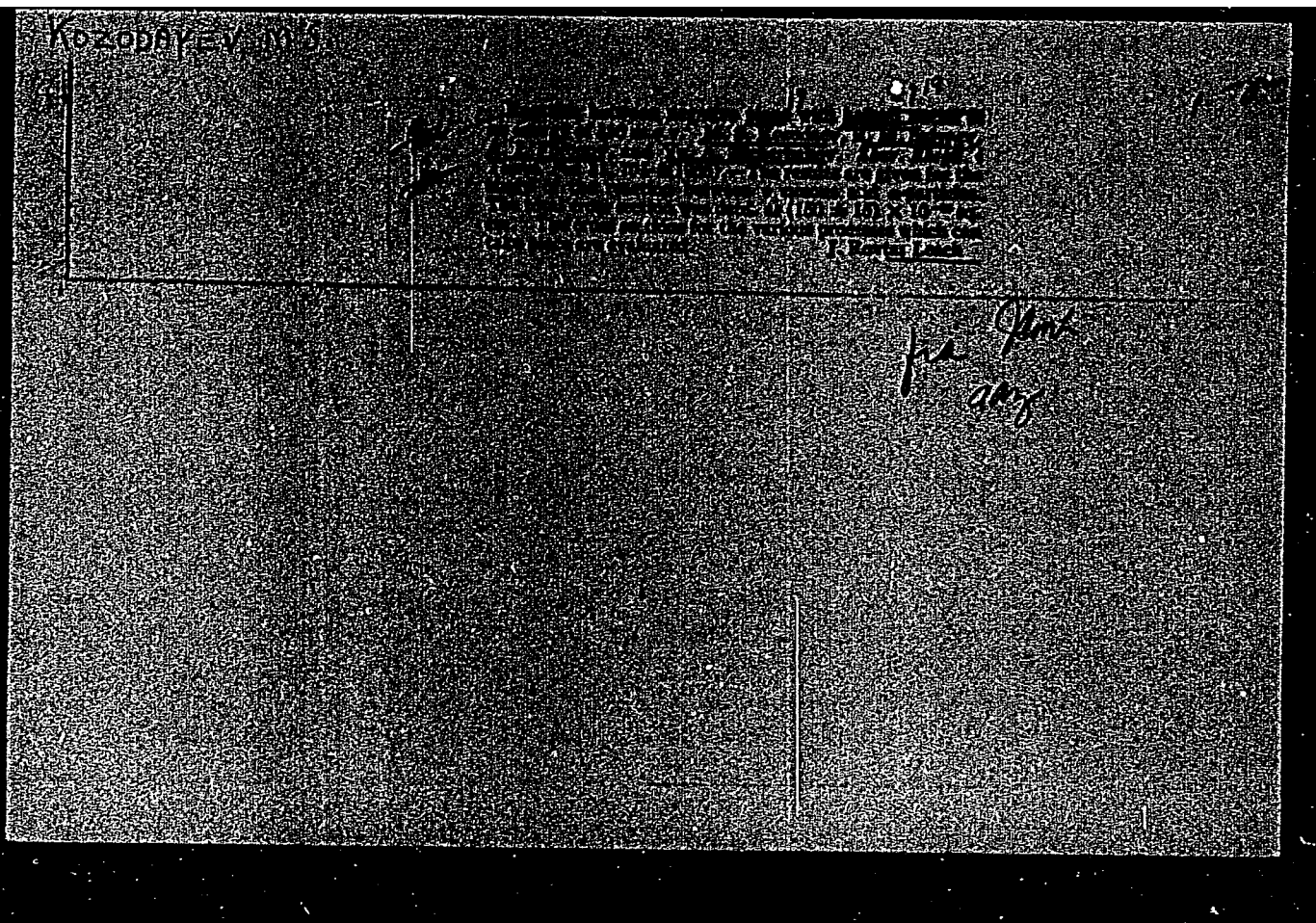
Author : Dzhelepov, V.P., Dmitriyevskiy, V.P., Katyshev, V.S.,
Kozodayev, M.S., Meshcheryakov, M.G., Sarakanov, K.I.,
~~Chestnoy, A.V.~~

Title : Particle Guns for High Energy Particles from a Six-Meter
Synchrocyclotron and Their Use.

Orig Pub : Atom. energiya, 1956, No 4, 13-21.

Abstract : The authors consider the problem of increasing the effi-
ciency of the six-meter phasotron of the Institute of
Nuclear Problems of the Academy of Sciences, USSR. A
procedure is described for obtaining and collimating a
large number of particle beams, on which several expe-
rimental setups can operate simultaneously.
Brief descriptions of these beams are given.

Card 1/1



KOZODAYEV, M. #5

AUTHOR: DZELEPOV, V.P., IVANOV, V.G., KOZODAEV, M.G., PA - 2003
OSIPENKOV, V.T., PETROV, N.I., RUSAKOV, V.A.
TITLE: Interaction between Negative Pions and Carbon and Lead Nuclei in
the Case of Energies of from 230 up to 250 MeV.
PERIODICAL: Zhurnal Eksperimental'noi i Teoret. Fiziki, 1956, Vol 31, Nr 6,
pp 923-931 (U.S.S.R.)
Received: 1 / 1957 Reviewed: 3 / 1957

ABSTRACT: This work was carried out on the synchrocyclotron of the Institute for Nuclear Problems of the Academy of Sciences in the USSR; it investigates the interaction mentioned in the heading by the method of the WILSON chamber which is located in a magnetic field.

The experimental device and the method for the treatment of the photographs:
A graphite target served as a source for negative pions; it was arranged in the chamber of the accelerator within the circulating bundle of the 670 MeV protons. The 230-250 MeV pions emitted in a forward direction from the target were directed by means of a large collimator and a deflecting magnet towards a WILSON chamber situated behind a concrete shield. In the chamber a plate of the material to be investigated was mounted under an angle of 90° with respect to the direction of the incident bundle of pions. The traces were photographed by means of a stereo camera. - Experimental results: 760 cases of 6000 photographs were found to represent cases of nuclear interaction between pions and carbon, and 629 others represented cases of interaction between pions and lead. Examples of such interactions are supplied in form of attached photographs. The following facts were

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Interaction between Negative Pions and Carbon-and Lead PA-2003
Nuclei in the Case of Energies of from 230 up to 250 MeV.

established in the course of work carried out with the experimental material:

A) The total and differential cross sections of elastic scattering within the range of the scattering angles of from 10 to 180°, B) The total and differential cross sections of nonelastic scattering, C) The energy distribution of the non-elastically scattered pions, D) The total cross sections of all nonelastic interaction processes. All cross sections measured for carbon- and lead nuclei referred to energies of 230+30 MeV and 250+30 MeV respectively.

Summary: The measured angular distributions and the total cross sections of the elastic scattering of pions in the case of scattering angles of $\theta > 10^\circ$ as well as the total cross sections of nonelastic interaction are satisfactorily described by the optic model of interaction between pions and composed nuclei. Nonelastic scattering within the range of the scattering angles of from 60 to 180° is chiefly due to simple collisions between impinging pions and single nucleons of the nuclei. The absorption of pions in the nuclear material takes place (also at lower energies) above all as a result of the capture of nuclear nucleons by (p-n) pairs. The total cross sections of the nonelastic interaction processes of pions are equal to geometric cross sections.

ASSOCIATION: Institute for Nuclear Problems of the Academy of Sciences in the USSR
PRESENTED BY:

Submitted:

AVAILABLE: Library of Congress.

CARD 2 / 2

KOZODAYEV, M. S.

Category : USSR/Nuclear Physics - Elementary Particles

C-3

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 391

Author : Kozodayev, M., Sulyayev, P., Filippov, A., Shcherbakov, Yu.

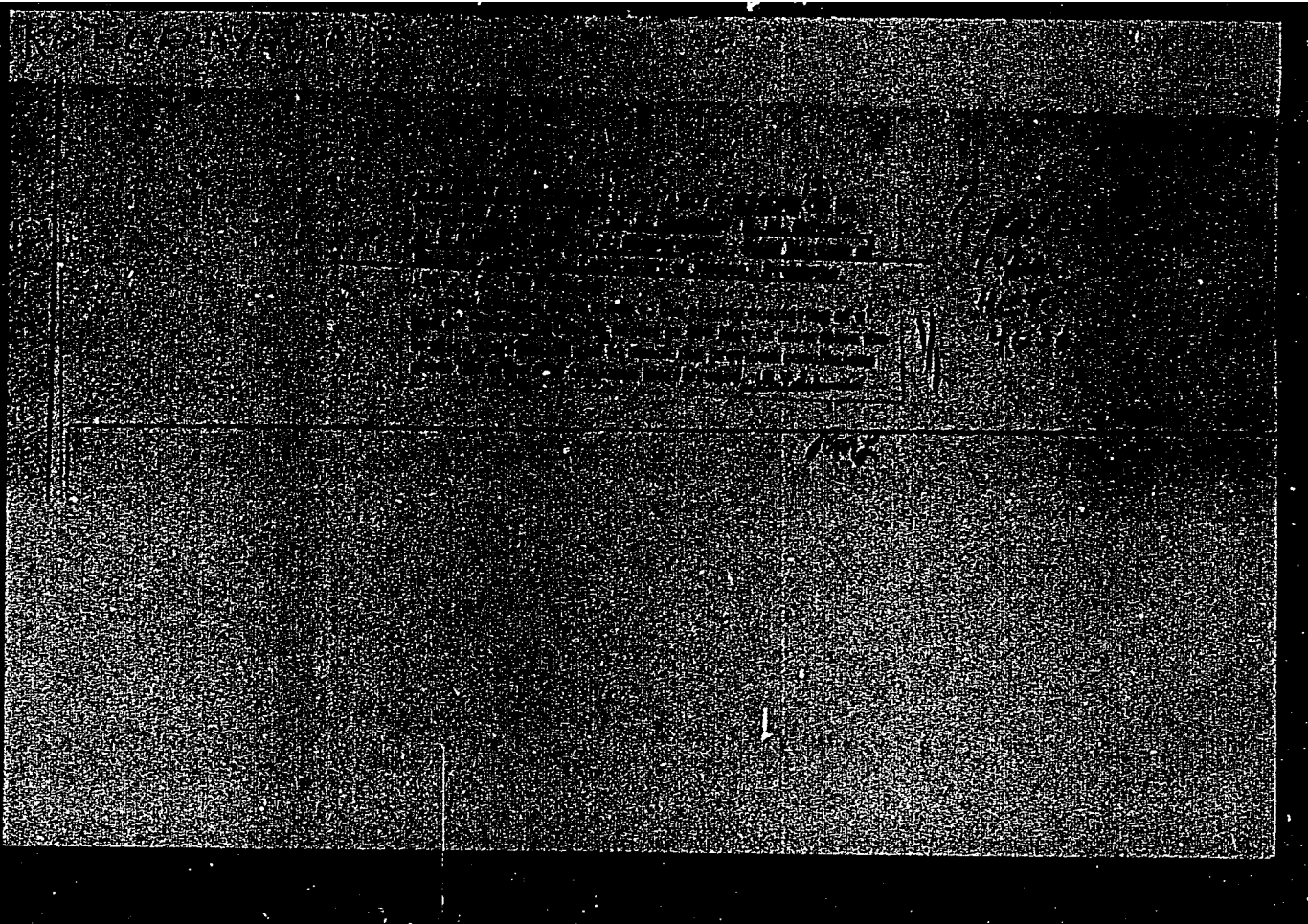
Inst : Inst. of Nuclear Problems, USSR Acad, of Sciences

Title : Study of the Scattering of Negative π -Mesons in Hydrogen with the Aid of a Diffusion Chamber.

Orig Pub : Dokl. AN SSSR, 1956, 107, No 2, 236-239

Abstract : Elastic scattering of 330 ± 6 Mev π^- -mesons was studied. Eleven cases of elastic scattering by protons and 13 cases of charge exchange were obtained. The corresponding cross sections are 11 ± 4 and 13 ± 4 millibarns, and the total section is 24 ± 5 millibarns. The ratio $\sigma_{ch.e.}/\sigma_{elast.} = 1.2 \pm 0.5$, while at lower energies it equals 2. The change in the value of the ratio $\sigma_{ch.e.}/\sigma_{elast.}$ indicates that for 330-Mev π^- -mesons one no longer sees a predominant interaction in the state with isotopic spin $3/2$; the interaction in the state with $T = 1/2$ becomes just as important.

Card : 1/1



KOZODAYEV, M.S., BAYUKOV, Yu. D., TYAPKIN, A.A.

"Investigation of Energy and Angular Distributions of π Mesons
Produced by Protons with Energies of 470 and 660 MeV," paper presented
at CERN Symposium, 1956, appearing in Nuclear Instruments, No. 1,
pp. 21-30, 1957

KOZODAYEV, M.S., DZHELEPOV, V. P., DMITRYEVSKIY, V.P., KATYSHEV, V.S.
MESHCHERYAKOV, M.G., PONTEKORVO, B., CHESTNOY, A.Y.

"High Energy Particle Beams from the Six Metre Synchrocyclotron
and their Utilization," paper presented at CERN Symposium, 1956,
appearing in Nuclear Instruments, No. 1, pp. 21-30, 1957

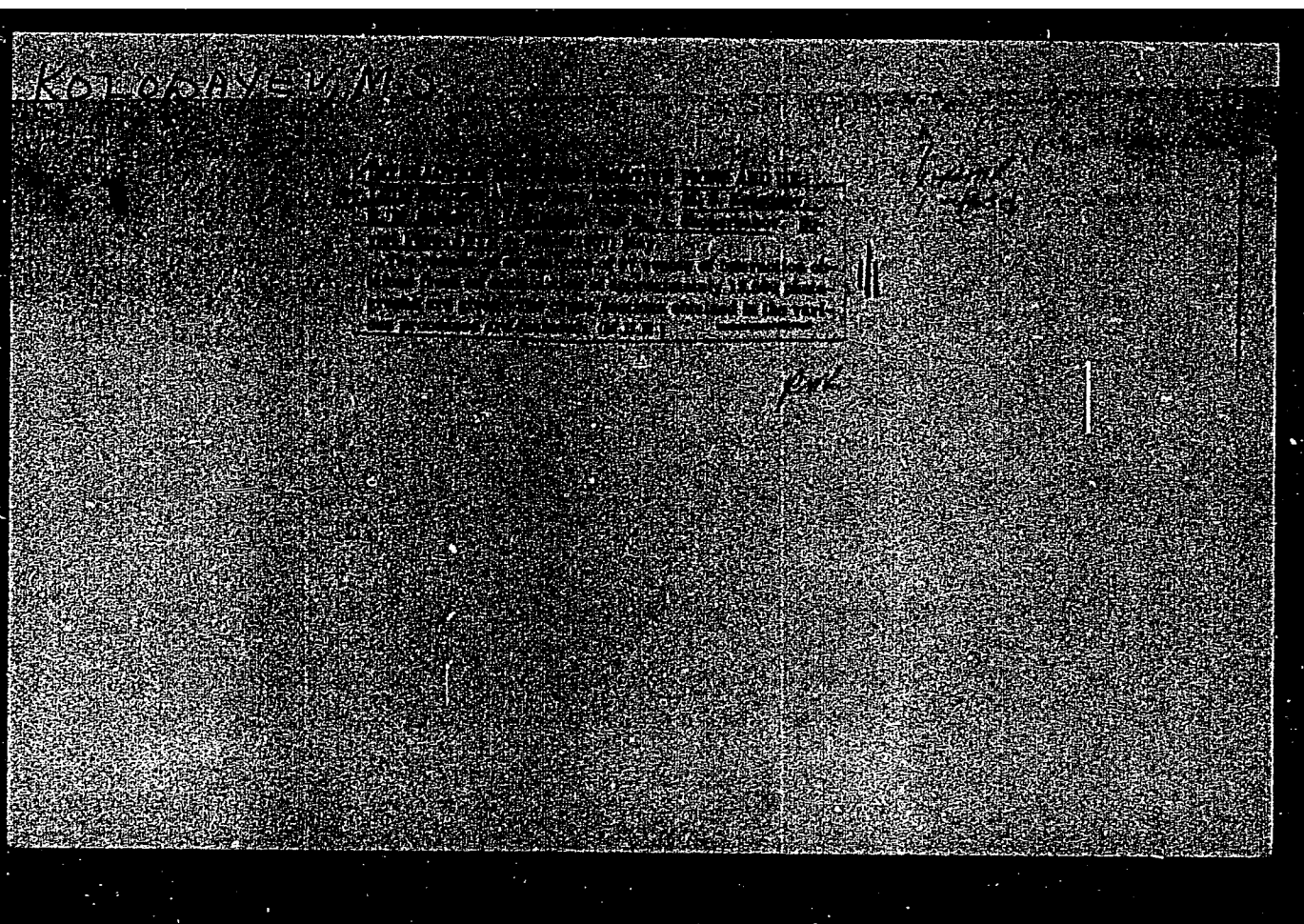
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APPROVED FOR RELEASE: Monday, July 31, 2000

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Kozodayev M.S.

120-6-7/36

AUTHORS: Vasilenko, A.T., Kozodayev, M.S., Sulyayev, R.M.,
Filippov, A.I. and Shcherbakov, Yu.A.

TITLE: Reprojector for Evaluating Stereographic Exposures
(Reproyektor dlya obrabotki stereofotografiy)

PERIODICAL: Priory i Tekhnika Eksperimenta, 1957, No.6,
pp. 34 - 37 (USSR)

ABSTRACT: Due to the development of methods of recording nuclear processes by means of diffusion and bubble chambers, it is possible to obtain within a relatively short time hundreds of thousands of photographs depicting the traces of charged particles. As a result of this, the people concerned with the experiments are faced with the problem of using effective methods of evaluation of the obtained material. Usually, it is necessary to determine the co-ordinates of some points, the curvatures of the traces and the spatial angle between some such traces. In this paper, an instrument is described for measuring the spatial co-ordinates, the angles and curvatures of the trajectories of charged particles by reproducing the traces of the particles photographed on two stereoscopic exposures by the method of reprojection on to a mobile screen, using the same optical system which was used for taking photographs. This permits observation on the instrument screens

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Reprojector for Evaluating Stereographic Exposures. 120-6-7/36

of the traces of particles in the natural size with the minimum of optical distortions. A sketch of the reprojector is shown in Fig.1 and photographs of it are reproduced in Figs. 2 and 3. This reprojector is more universal than various instruments described earlier in Western literature. Data are given on the errors of measuring the co-ordinates and angles by means of this instrument; the maximum error in measuring the z co-ordinate did not exceed 0.4% and, for an angle of 60° , the error in measuring the angle does not exceed 1° . Acknowledgments are made to V.P. Tokarskiy, K.A. Baycher and A.G. Potekhin for their advice and for setting the instrument and to G.A. Vinogradova for helping to determine the metering errors. .
There are 3 figures and 7 references, 2 of which are Slavic.

ASSOCIATION; United Institute for Nuclear Studies
(Ob'yedinennyy Institut yadernykh issledovaniy)

SUBMITTED: May 20, 1957.

AVAILABLE: Library of Congress
Card 2/2

Kozodayev, M.S.
USSR/Nuclear Physics - Elementary Particles.

C-3

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 363
Author : Bayukov, Yu.D., Kozodayev, M.S., Tyapkin, A.A.
Inst : Joint Institute for Nuclear Research.
Title : Investigation of Energy and Angular Distributions of π^0 Mesons, Formed on Carbon Nuclei by 470 and 660 Mev Protons
Orig Pub : Zh. eksperim. i teor. fiziki, 1957, 32, No 4, 667-677
Abstract : An investigation was made of the energy spectrum of gamma-quanta from the decay of π^0 mesons, formed by 660 Mev protons on carbon nuclei. The angular and energy distributions of the π^0 mesons, obtained from the analysis of the gamma-quanta spectra formed on carbon nuclei by 470 and 660 Mev protons, are given. The results of the investigations are presented graphically.

Card 1/1

AUTHORS: Kozodayev, M.S., Sulyayev, R.M., Filippov, A.I., Shcherbakov, Yu.A.
TITLE: The Elastic Scattering of π^\pm -Mesons on Helium Nuclei at an Energy of 300 MeV (Uprugoye rasseyaniye π^\pm - mezonov na yad-rakh geliya pri energii 300 MeV)(Letter to the Editor)
PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol. 33, Nr 4, pp. 1047 - 1049 (USSR)
ABSTRACT: The elastic scattering was investigated by means of a diffusion chamber (filled with helium of 15 atmospheres absolute pressure). 24000 photographs were taken and investigated for π^- -mesons with 300 ± 6 MeV and 11000 photographs for π^+ -mesons with 273 ± 7 MeV. The absolute scattering cross section for the π^- -mesons was measured with 45 ± 5 mb and that for π^+ -mesons with 72 ± 11 mb. From the measured angular distribution it may be concluded that on the occasion of the scattering with in small angles an interference effect is present between the coulombian scattering and the nuclear scattering. In a supplement the authors define their attitude regarding the recently again discussed problem that the π^- -mesons have a spin differ-

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ent from zero. More experimental material is gathered, in order to bring about a solution of this problem. There are 3 figures and 3 Slavic references.

ASSOCIATION: United Nuclear Research Institute
(Ob'yedinennyy institut yadernykh issledovaniy)

SUBMITTED: June 21, 1957 (initially) and July 25, 1957 (after revision)

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AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A., Sinayev, A. N., Tyapkin, A. A.

TITLE: A Multichannel Pair γ -Spectrometer. I. Calculation of the Main Characteristics of the γ -Spectrometer (Mnogokanal'nyy parnyy gamma-spektrometr. I. Raschet osnovnykh kharakteristik-gamma-spektrometra)

PERIODICAL: Pribory i tekhnika eksperimenta, 1958, Nr 6, pp 23-29 (USSR)

ABSTRACT: In a pair γ -spectrometer the energy of the quanta is determined by measuring the total energy of the components of the electron-positron pair formed in a thin converter. The first 2-channel pair spectrometer was built by Dzhelepov (Ref. 2). Later spectrometers built on this principle were widely used in measuring the spectra of hard γ -rays (Refs. 2 to 8). The electron and the positron leaving the converter were deflected by a magnetic field in different directions and for certain values of their energy they enter ionisation counters connected in coincidence. For a given intensity of the magnetic field and a fixed position of the counters, such a spectrometer will record a fraction of the pairs produced by γ -rays in a given energy range. In a simple 2-channel spectrometer in which one channel records the electrons and

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the other the positrons, an increase in the accuracy of measurement is associated with a marked decrease in the efficiency. Good energy resolution and high efficiency can only be simultaneously achieved in a multichannel spectrometer. In such a spectrometer the efficiency may be increased by a factor $n_1 n_2$ without loss of resolution, where n_1 and n_2 are the numbers of electron and positron counters. In such a spectrometer several energy intervals may be examined at the same time. A number of such multichannel spectrometers have been described (Refs. 5, 6 and 8). The quality of a γ -spectrometer as a measuring instrument is determined by its efficiency and spectral sensitivity. In designing a multichannel system it is necessary to take into account these characteristics for the various pairs of channels of the spectrum. In this connection, a discussion is given in the present paper of the dependence of the efficiency and spectral sensitivity of the separate pairs of channels on various

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parameters of the spectrometer:

1) Spectral sensitivity: the basic diagram of a γ -spectrometer considered in this paper is shown in Fig.1, in which the meanings of the symbols employed are indicated. In view of the finite width of the counters, the spectrometer records γ -quanta in a certain energy interval from $E_{\gamma \min}$ to $E_{\gamma \max}$. The corresponding spectral sensitivity curve is then shown in Fig.2a and is of triangular form with a dispersion given by

$$\sigma_{12} = 1/6 \, l_c^2 / (r_1 + r_2)^2 \quad \text{where } l_c \text{ is the width of a}$$

counter and r_1 and r_2 are the distances from the converter to the centres of the counters, respectively. The effect of the width of the converter upon the spectral sensitivity is examined and it is shown that a converter of a finite width introduces a spread into the spectral line in the high energy region of γ -quanta. As the angle ϕ between the direction of motion of the γ -quanta and the straight line connecting the centre of the converter with

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the counter increases, the spread of the spectral line decreases. At $\varphi = 90^\circ$ the width of the spectral sensitivity curve is independent of the converter width. The effect of the converter width gives a distribution of the form shown in Fig.2b, which has a dispersion given by:

$$\sigma_2^2 = \frac{h_k^4 \text{ctg}^4 \varphi}{180 r_1^2 \cdot r_2^2} \quad . \quad \text{The effect of multiple}$$

scattering in the converter is estimated and expressions are derived for this effect also. Finally, an estimate is given for the radiation loss experienced by the electron-positron pair on traversing the converter.

2) Efficiency: in this section the Bethe-Heitler expression for the probability of formation of a pair by a γ -quantum of

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energy E_γ is used (Ref.13) with a modification described by Bethe ^Yet al in Ref.22.

3) Multichannel system: in a multichannel spectrometer the electrons and positrons formed by γ -quanta of a given energy are recorded by a number of combinations of pairs of counters. The electronic circuit of such a spectrometer should record coincidences between pulses from each electron counter with pulses from any positron counter. Thus, any combination of one electron counter and one positron counter is, in fact, a 2-channel spectrometer. For a given geometry a spectrometer containing n channels records γ -quanta in $n-1$ energy intervals of different mean energy. In practice, one seeks to find the form of the spectrum and the absolute intensity in one of the energy intervals. To find the form of the spectrum it is sufficient to know the relative efficiency of recording for the different energy intervals, and this is given by Eq.(10). In order to obtain the absolute intensity in one of the energy intervals it is necessary to know the total absolute efficiency of recording of γ -quanta in one of the energy intervals. This problem is not treated.

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V. V. Mel'nikov is thanked for carrying out a number of calculations. There are 2 figures and 22 references, of which 4 are Soviet, 1 German, 1 Soviet translated from English and the rest are English.

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy
(United Institute for Nuclear Studies)

SUBMITTED: December 27, 1957.

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SOV/120-58-6-5/32

AUTHORS: Bayukov, Yu. D., Kozodayev, M. S., Markov, A. A. Sinayev, A.N., Tyapkin, A. A.

TITLE: A Multichannel Pair γ -Spectrometer. II. Description of a 12-channel Spectrometer (Mnogokanal'nyy parnyy gamma-spektrometr. II. Opisaniye dvenadtsatikanal'nogo spektrometra)

PERIODICAL: Priory i tekhnika eksperimenta, 1958, Nr 6, pp 30-40 (USSR)

ABSTRACT: Application of a multichannel pair spectrometer in synchro-cyclotron work presents a number of specific requirements as far as counters of the ionising particles and the electronic system of the spectrometer are concerned. Since the beam intensity is high and consists of short pulses of 200 to 300 μ s each at a repetition frequency of 40 to 80 pulses per sec, it follows that the apparatus must be very fast. It is desirable that the input blocks should have resolving times not greater than 1 μ s. The large background intensity in synchro-cyclotron work means that it is always necessary to use a special selection system which records only electron-positron pairs. For this reason, in the spectrometer each component of a pair should be recorded by a number of counters in coincidence with sufficiently low resolving time. The Card 1/7 present paper describes a 12-channel γ -spectrometer which has

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been used over a number of years in studying the spectra of hard γ -rays and neutral π -meson decays (Refs.2-6). The first variant of the spectrometer was built in 1949. In 1951 and 1954 the spectrometer was modified to improve its characteristics. The spectrometer described here satisfies completely the above requirements and is based on the design calculations given in the previous paper (Ref.1) in this issue.

1) Magnetic system and geometry of the instrument.

The magnetic field is produced by an SP-56 electromagnet. Fig.1 shows the disposition of the counters for two types of demountable pole pieces. The gap between the poles is 18 cm and the maximum field in the gap is 18 000 oersted. The electromagnet current is stabilised to 0.1%. In studies of γ -ray spectra in the energy region 20 to 200 MeV, $2\phi = 180^\circ$ (Fig.1b) and in the energy region 100 to 450 MeV, $2\phi = 90^\circ$ (Fig.1a). In the former case semi-circular focussing of

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electrons and positrons was used, and this led to increased efficiency (Ref.1) because it was possible to use wider and thicker converters. For γ -quanta in the energy range 450-600 MeV, $2\phi = 90^\circ$ but the counters were at a larger distance from the converter. Copper converters were used (0.1, 0.3 and 0.5 mm, depending on the energy).

2) Resolving power and efficiency.

Fig.2 shows curves of the total spectral sensitivity for the 7th energy interval for various values of $E_{\gamma 0}$ and thicknesses T_k of the copper converters. These curves are based on the theoretical data given in the previous paper and are obtained by a statistical combination of the partial distributions due to a) width of the counters, b) width of the converter, c) multiple scattering and d) radiation. As can be seen, the form of the total spectral sensitivity curve is ~~very~~ nearly triangular, which means that the total spectral sensitivity is governed mainly by the width of the channels ℓ_c (see Fig.1 of previous paper, p 24, this issue).

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3) Counters and selection system. The counters used were proportional counters having a cylindrical stainless steel cathode, 10 mm in diameter and a molybdenum filament 0.1 mm in diameter. They were filled with $(CH_2(OCH_3)_2)$ at a pressure of 160 to 200 mm. The working voltage was 1600 to 2000 V. The counters have an effective dead time not exceeding 10^{-7} sec. The efficiency of the counters for particles with relativistic ionisation reaches 98% in a coincidence scheme with a resolving time of 5×10^{-7} sec. The delay of the pulses due to drift of electrons through the counter gas is less than 10^{-7} . The counters give electrical pulses with amplitudes between 10^{-4} and 1 V. The large difference in the amplitudes requires the use of amplifiers having a wide dynamic range and an amplification of a few thousands. 6-fold coincidences were used and the number of random coincidences in each 6-fold channel was 0.02 pulses per sec. The number of electron-positron pairs recorded per

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sec depended on the efficiency of the spectrometer with respect to the γ -quanta in the measured energy interval and the form of the spectrum and was in the range 0.1 to 10 pairs per sec.

4) Electronic scheme.

A block diagram of the electronic part of the spectrometer is shown in Fig.3. The left-hand portion of this diagram shows 6 co-ordinate counters of the electron series ($a_1 - a_6$), 6 co-ordinate counters of the positron series ($b_1 - b_6$) and 4 selection counters (A', A'', B' and B''). Each of these counters in practice consists of a group of counters whose filaments are connected. A recorded electron or positron should pass through 3 counters (1 co-ordinate and 2 selection counters). A pair is recorded if a 6-fold coincidence takes place. Negative-going pulses from each counter are amplified by a corresponding amplifier-converter (Fig.4). These amplifiers have a rise time of 2×10^{-4} sec. Pulses from all the 16 amplifier-converters are applied to the main block which is at a distance of 1.5 m from the amplifier-converters (Fig.5). Pulses from the selection counters are applied to a

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4-fold coincidence scheme while pulses from the co-ordinate counters are applied to mixers and in addition through delay lines to a hodoscopic system consisting of 2-fold coincidence circuits and output univibrators. The pulse at the output of a mixer appears in the presence of a pulse in at least one of the co-ordinate counters of a given series. Pulses from both the mixers and also from the 4-fold coincidence scheme are applied to a 3-fold coincidence scheme which produces the final output pulse. It follows that the latter pulse appears when a 6-fold coincidence takes place, i.e. when a particle passes through at least one of the co-ordinate counters in the electron series, through one of the co-ordinate counters of the positron series, and all the counters of the selection system. The resolving time of the above coincidence schemes is 5×10^{-7} .

5) Method of measurement and treatment of results.

Fig.7 shows the experimental arrangement. In this figure 1 is the proton trajectory, 2 is the target, 3 is the synchro-cyclotron chamber, 4 is a concrete wall, 5 is a collimator,

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6 is a diaphragm, 7 is a clearing magnet which removes electrons and positrons from the beam, 8 is an additional screen, 9 is the convertor and 10 is the spectrometer electro magnet. Fig.8 shows a typical result obtained for the energy spectrum of γ -quanta from neutral π -meson decays. The mesons were produced by 660 MeV protons at a carbon target. The spectra are measured at an angle of $180-0^\circ$ to the direction of motion of the protons. G.P.Zorin, B.A.Krasnovidov, L. A.Fadeyev and G.N.Stepanov are thanked for their assistance. There are 8 figures, 4 tables and 7 Soviet references.

ASSOCIATION: Ob'yedinennyi institut yadernykh issledovaniy (United Institute for Nuclear Studies)

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AUTHORS: ~~Kozodayev, M. S.~~, Kulyukin, M. M., Sulyayev, R. M., Filippov, A. I. and Shcherbakov, Yu. A.

TITLE: A High Pressure Diffusion Chamber in a Pulsed Magnetic Field
(Diffuzionnaya kamera vysokogo davleniya v impul'snom magnitnom pole)

PERIODICAL: Priory i tekhnika eksperimenta, 1958, Nr 6, pp 47-55
(USSR)

ABSTRACT: At the present time diffusion chambers are widely used in studies with accelerators. They have turned out to be sufficiently efficient for studying the interaction of nucleons and mesons with separate nucleons and light nuclei (Refs.1 and 2). An installation is described in the present paper which includes a diffusion chamber in a magnetic field which has been used in studying the interaction of protons and mesons with light nuclei. In distinction to other chambers, e.g. those described in Refs.4-6, the necessary temperature distribution in the sensitive layer is set up by means of an internal plexiglass cylinder, as described by Kozodayev et al (Refs.7 and 8). By this means it is possible to reduce the magnitude of horizontal gradients which are the main source of undesirable convections in the chamber. Such a reduction in convective distortion of tracks leads to an increase in the

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accuracy in the measurement of momenta. Because of the strong equalising action of the plexiglass cylinder it was found possible to reduce the distance between the side boundaries of the sensitive layer and the outer walls of the chamber and thus improve the utilisation of the working volume of the magnet. Such a construction of the windows means that it is possible to remove the chamber from the magnet without dismantling the latter. It also means that it is possible to use selenoid magnets with small gaps between the coils which in turn makes it easier to obtain large magnetic fields with good homogeneity and economy of supplies. The installation described in this paper consists of a selenoid magnet MS-4, a system for evacuating and filling the chamber and a control panel which controls the accelerator, the chamber and the magnet. The external view of the installation is shown in Fig.1. The chamber was built in 1955 (Ref.3). The diameter of the working region of the chamber is 30 cm, the external diameter being 45.6 cm. The chamber was designed

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